# General Informations:

**Curriculum:** Architecture Bsc, Architecture OTM

**Name of Course: Strength of Materials**

**Course Code:** MSE001AN, MSE402AN

**Semester:** 2nd

**Number of Credits:** 3

**Allotment of Hours per Week:** 0/2/0

**Evaluation:** examination grade

**Prerequisites: Mechanics I. (Statics) MSE256AN**

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## General Course Description and Learning Outcomes

Students continue to learn the fundamentals of mechanics, compression and stressing of bar structures, which helps them with dimensioning basic structural components of construction and selecting the most appropriate materials. To assist with this, students learn the rules of technical and building constructional representations and various structural systems.

## Subject content

In particular, students cover the following topics: stress and deformation, Hooke’s Law, axial pre-stressing and compression of bar structures, pure shear, design of bolted joints, wooden joints, bending stress, perpendicular and oblique bending, shear stresses with simultaneous bending, eccentric stresses of materials with and without tension strength.

Practice: Topics

1. Introduction. Course description. Orientation.

2. Summary Geometrical properties. Centroid, first and second moments of inertia. Product of inertia, principal directions.

3. Stresses. Principal stresses. Mechanical properties of materials.

4. Strains. Normal strain, shear strain, Cartesian strain components. Transverse contraction.

5. Normal stresses in case of axial loading.

6. Mechanical properties of materials. Stress-strain diagrams. Elastic and plastic behaviour. Hooke’s law. Design of cross sections.

7. Shear stresses in case of simple shear.

8. Bolted joints in single and double shear. Wooden joints.

9. Pure torsion

10. Simple and coupled bending

11. Shear stresses with simultaneous bending, Zhuravskiy’s formula.

**Examination and evaluation system**

*In all cases. Annex 5 of the Statutes of the University of Pécs, the* ***Code of Studies and Examinations (CSE)******of the University of Pécs*** *shall prevail*

[*https://international.pte.hu/sites/international.pte.hu/files/doc/Code%20of%20Studies%20and%20Examinations\_2023\_06\_22.pdf*](https://international.pte.hu/sites/international.pte.hu/files/doc/Code%20of%20Studies%20and%20Examinations_2023_06_22.pdf)

**Attendance**

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description..

Method for monitoring attendance: attendance sheet

**Assessment**

**Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam**

|  |  |  |
| --- | --- | --- |
| **Type** | **Assessment** | **Weighting as a proportion of the pre-requisite for taking the exam** |
| *Home Assignment (project documentation)* | *max 50 points* | *50 %* |
| *Test 1* | *max 20 points* | *20 %* |
| *Test 2* | *max 30 points* | *30 %* |

**Requirements for the end-of-semester signature**

Mid-term assessment of 40%.

***Re-takes for the end-of-semester signature*** *(PTE TVSz 50§(2))*

*The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.*

**Type of examination**: written exam

The exam is successful if the result is minimum of **40 %**.

**Calculation of the grade (TVSz 47§ (3))**

The mid-term performance accounts for **50 %**, the performance at the exam accounts for **50 %** in the calculation of the final grade.

**Calculation of the final grade based on aggregate performance in percentage**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Grade: | 5 | 4 | 3 | 2 | 1 |
|  | A, excellent | B, good | C, satisfactory | D, pass | F, fail |
| Performance in % | 85%-100% | 70%-84% | 55%-69% | 40%-54% | 0-39% |

## Readings and Reference Materials

Required:

[1.] Russel C. Hibbeler, Mechanics of Materials (9th Edition), ISBN-13: 978-0133254426, Teams group

[2.] Lecture notes provided during the course

Recommended:

[3.] Wight, J. K, MacGregor J. Reinforced concrete mechanics & design, Pearson, 2012.

[4.] Riley, Mechanics of Materials, ISBN-13: 978-0471705116

## Students with Special Needs

Students with a disability and needs to request special accommodations, please, notify the Deans Office. Proper documentation of disability will be required. All attempts to provide an equal learning environment for all will be made.

## Schedule

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Practice | | | | |
| week | **Topic** | **Compulsory reading; page number**  **(from … to …)** | **Required tasks (assignments, tests, etc.)** | **Completion date, due date** |
| 1. | Introduction. Course description. Orientation. |  |  |  |
| 2. | Summary Geometrical properties. Centroid, first and second moments of inertia. Product of inertia, principal directions. | [1.], [2.] |  |  |
| 3. | Stresses. Principal stresses. Mechanical properties of materials. | 1.], [2.] |  |  |
| 4. | Strains. Normal strain, shear strain, Cartesian strain components. Transverse contraction. | [1.], [2.] |  |  |
| 5. | Normal stresses in case of axial loading. | [1.], [2.] |  |  |
| 6. | Mechanical properties of materials. Stress-strain diagrams. Elastic and plastic behaviour. Hooke’s law. Design of cross sections. | [1.], [2.] |  |  |
| 7. | ***Test 1*** |  | Manual calculation test. | 90-minute test, due at the end of the class. Submission on engineering paper. |
| 8. | Shear stresses in case of simple shear. | [1.], [2.] |  |  |
| **9.** | ***Spring Holiday*** |  |  |  |
| 10. | Bolted joints in single and double shear. Wooden joints. | [1.], [2.] |  |  |
| 11. | Pure torsion | [1.], [2.] |  |  |
| 12. | Simple and coupled bending | [1.], [2.] |  |  |
| 13. | Shear stresses with simultaneous bending, Zhuravskiy’s formula | [1.], [2.] |  |  |
| 14. | ***Test 2*** |  | Manual calculation test. | 90-minute test, due at the end of the class. Submission on engineering paper. |

We reserve the right to make changes to the details of this course syllabus (date / location / clarifications), which will be communicated to the students. In case of questions and problems that arise during the semester contact the responsible lecturer or the study program coordinator.

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course director

Pécs, 26.01.2024